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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/543,185

03/23/2006

Norio Murase

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EXAMINER

HOBAN, MATTHEW E

ART UNIT

PAPER NUMBER

1793

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/543,185	<b>Applicant(s)</b> MURASE ET AL.	
	<b>Examiner</b> Matthew E. Hoban	<b>Art Unit</b> 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 16 June 2010.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 6,7 and 13-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 6,7 and 13-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)                        | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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Claims 6, 13-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barney in 2002/0110180 in view of Seddon in their publication entitled "CdSe Quantum Dot Doped Amine-Functionalized Ormosils".

**Regarding Claims 6:** Barney teaches a temperature sensing composition that includes a matrix composition and semiconductor nanocrystals exhibiting fluorescence. It is stated that the quantum efficiency of the nanocrystals used can be greater than 20% and even greater than 80%. (See Paragraph 18). Barney goes on to state that the matrix in which the semiconductor nanocrystals are disposed can be an inorganic matrix such as a sol-gel derived matrix. (See paragraph 30). Barney then gives suitable precursors for such a matrix including hydrolysable compositions including silicon alkoxides(See Paragraph 32).

Barney is silent as to the use of organoalkoxysilanes as defined in instant claim 6.

However, the creation of sol gel glasses using both semiconductor fine particles with such organoalkoxysilanes are known in the prior art. Specifically Seddon shows the creation of thin films of CdSe in an ambiently hydrolyzed ormosil glass, wherein the glass is synthesized through the hydrolysis of aminopropyltrimethoxysilane. Seddon shows that CdSe is dispersible in this matrix to a very high degree of 2.05 wt%.

Thereafter it would have been obvious to use a hydrolysable silicon alkoxide such as aminopropyltrimethoxysilane to create the article as taught by Barney. It has been

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shown by Seddon that CdSe is highly compatible with this matrix material.

Furthermore, it is noted that Seddon's composite has the final use as a non-linear device where it is tested over telecom frequencies, where these frequencies have wavelengths far greater than that of the use of Barney. Although Seddon does not test the photoluminescent behavior of the composite, it has been explicitly shown that said particles are dispersible to a great degree in this material. One of ordinary skill in the art would note this level of dispersibility as well as the fact that the materials used would not inherently inhibit photoluminescence. Thereafter, based on these facts one of ordinary skill in the art would be highly motivated to use the ormosil of Seddon in the creation of Barney's article, as those ormosils fall directly in the class of materials used in the creation of Barney's QD glasses.

**Regarding Claim 13:** Barney teaches that the matrix-semiconductor composite can be excited using a 480 nm wavelength excitor. Therefore the light emitting device system of Barney includes the matrix-nanocrystal composite, as well as a 480 nm source light. It can also further include a photomultiplier.

**Regarding Claim 14 and 18:** Seddon teaches the use of aminopropyltrimethoxysilane, a chemical where the group associated with OR is a methoxy group and X is an aminopropyl group. The aminopropyl group is an aminoalkyl group where m is 3.

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**Regarding Claim 15:** The composite is of the same chemical structure as that of the claimed subject matter. It would necessarily follow that the hardness of the structure would be the same as that which is claimed. Composites of the same structure and chemical identity must necessarily have the same properties without convincing evidence to the contrary. See MPEP 2112.01.

**Regarding Claim 16-17:** Barney teaches the suitability of II-VI semiconductors.

Teachings include specific examples pertaining to CdSe, although CdTe is also shown to be a suitable quantum dot semiconductor for use in their endeavors.

4. Claims 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Barney in 2002/0110180 in view of Seddon in their publication entitled "CdSe Quantum Dot Doped Amine-Functionalized Ormosils" as applied to claim 6 above, and further in view of Selvan in "Synthesis of tunable, highly luminescent QD-glasses through sol-gel processing"

Barney in view of Seddon teach glasses containing nanoparticles of semiconductors, which exhibit luminescence based on the temperature of the medium. Barney teaches several types of materials useful in this endeavor including alkoxysilanes, where Seddon teaches a specific aminopropyltrimethoxysilane useful for dispersing said nanoparticles.

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Barney is silent as to the concentration of QD semiconductors used in the glass of his teachings.

However, Selvan teaches suitable concentrations in similar QD-glasses. Selvan shows QD concentrations up to .1 vol%, which converts to  $1\text{E-}5$  mol/l of semiconductor nanoparticles based on the average particle size of Barney's glass ( 7 nm). Given the broad range of possible concentrations taught by Seddon one would turn to other art within the QD-glass field. The concentrations taught as suitable by Selvan are highly useful in the art of luminescent devices and are less than the maximum concentration of CdSe particles dispersible in the ormosil taught by Seddon.

Where Barney is silent to certain key considerations in making a product, one of ordinary skill in the art would turn to similar references in order to determine certain parameters which may be considered common knowledge. Selvan is such a reference, where it teaches suitable concentrations of semiconductor particles in order to make a functional glass with notable response and clarity. The references are highly compatible in that both teach QD glasses using similar materials.

### ***Response to Arguments***

5. Applicant's arguments with respect to claim 6 have been considered but are moot in view of the new ground(s) of rejection. The amendment to the claims is noted. This

amendment clearly defines the term organoalkoxysilanes to a greater degree. It is also noted that in terms of the previous rejection, the designation in X is easily confused as the other variable functionality is designated by the term 'OR'. This term could be easily misinterpreted as the word 'or'. Definition of the two variable functional groups in the silane would be more clear if this 'OR' group were to be delineated before the X group. Such an amendment would not alter the scope of the claim. Alternatively, a transitional phrase could be introduced before 'OR' as this would separate the definition of OR from that of X to a greater degree. Although this language is not objectionable or rejectable, it would lead to greater clarity as it clearly was misinterpreted in the previous correspondence. Turning to the amendment, which clearly teaches over Barney alone; a secondary reference to Seddon is included with this rejection. This reference clearly teaches an organoalkoxysilane as defined by applicant. Certain considerations as to the context of this reference are discussed above in the body of the rejection. It is believed that this reference clearly shows the suitability of said silanes.

### ***Conclusion***

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the



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shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew E. Hoban whose telephone number is (571) 270-3585. The examiner can normally be reached on Monday - Friday from 7:30 AM to 5 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on (571) 272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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